REMARKS

Claims 1-29 are pending. By way of an Office Action dated December 21, 2000, claim 1 is allowed; claims 2,6,7, and 29 are rejected; and claims 3-5 and 8-28 are rejected. Applicant herein submits the present remarks and amendments and respectfully requests reconsideration and allowance of the application.

Claim Objections

In the outstanding Office Action, the Examiner objects to claims 9-12, 16, 18-21, and 23-28 as being improper multiple dependent claims in accordance with MPEP 608.01(n). Further, the Examiner objects to claims 13-15 and 17 as depending from improper multiple dependent claims.

Applicant herein amends claims 9-12, 16, 18-21, and 23-28 to address the Examiner's concerns. Applicant submits that amended claims 9-12, 16, 18-21, and 23-28 are now in proper form and that claims 13-15 and 17 properly variably depend therefrom. Applicant further submits that claims 9-21, and 23-28 variably depend from an allowable claim 2 (see discussion below) and, thus, these claims are allowable. Reconsideration of the objections, prosecution on the merits, and allowance of claims 9-21 and 23-28 is respectfully requested.

Claims 3, 4, 5, 8, and 22 are objected to as being dependent upon a rejected base claim but are indicated in the Office Action as being allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Claims 3-5, 8, and 22 variably depend from independent claim 2. Applicant herein submits that claim 2 is allowable (see discussion below). Accordingly, claims 3-5, 8, and 22 are allowable as depending from an allowable base claim. Reconsideration and withdrawal of the objections of claims 3-5, 8, and 22 and allowance thereof is respectfully requested.

Claim Rejections – 35 U.S.C. 102

In the outstanding Office Action, claims 2, 6, 7, and 29 are rejected as being anticipated by U.S. Patent No. 4,328,648 to Kalpins (hereinafter, Kalpins).

With regard to independent claim 2, Applicant herein submits that Kalpins fails to teach or suggest all of the claim limitations recited therein. Therefore, Kalpins does not anticipate claim 2 and, thus, the rejection is improper and may not be maintained.

In claim 2, Applicant recites a device for the protection of an object against oscillations of the base including a coupling element or a combined coupling-supporting element having a support point for supporting the object there at. The coupling element or combined coupling-supporting element is supported and connected to a base by supporting elements. The supporting elements are able to swing in any direction and are coupled together by the coupling element or combined coupling-supporting element. The supporting elements are dimensioned and positioned such that in an initial resting position the support point on each coupling element or coupling-supporting element is able to freely move in any lateral direction. The translation permitted of the support point

is comparable to movement in the locus of a concave sphere in which the free end of a biaxially suspended very long pendulum would move, thus realizing the effect of a Virtual Pendulum that is able to swing in all directions.

Applicant's concept of Virtual Pendulum is described in the specification, for example, at page 14, lines 11-14, as effectively simulating the action of a long pendulum with a long period, despite the relatively small dimensions of the actual device. That is, the device of Applicant's invention is a Virtual Pendulum in that the support point is capable of movement analogous to that of a pendulum having a length far greater than any dimension of the device. That is, the effect of the device is that the supported object behaves at the support point in motion relative to the base as if suspended from a very long pendulum with great effective pendulum length wherein the actual lengths of the coupling element or combined coupling-supporting element and the supporting elements are far less.

The device having Virtual Pendulum properties protects the supported object from movement of a base or of the ground by providing the object with a very large oscillation period relative to that of the base or ground movement. This reduces acceleration of the object relative to the base/ground, reduces resonant frequency of the object, and, in effect, discouples the object from the movement of the base/ground even where such movement is of the highest magnitude.

Turning now to Kalpins, Applicant respectfully submits that the reference fails to teach or suggest all the limitations of the present claim 2. Specifically, Applicant submits that Kalpins does not teach or suggest a device for the protection of an object against oscillations of a base including, among other elements, a coupling element with a support

point for supporting the object, the coupling element being supported and connected to the base by supporting elements swingable in any direction where the supporting elements are dimensioned and positioned such that in an initial resting position the support point on each coupling element is able to freely move in any lateral direction comparable to movement in the locus of a concave sphere in which the free end of a biaxially suspended *very long pendulum* would move, thus realizing the effect of a *Virtual Pendulum* that is able to swing in all directions, as recited in claim 2.

Kalpins teaches a support system directed toward providing a hanging connection between supported and supporting structural bodies and accommodating for compression and tension forces existing therebetween. Col. 1, lns. 28-33. The support system, as shown in Figure 1, is disclosed as including a base 28 rigidly connected to a supporting structure 26, e.g. the ground, a pedestal 39 rigidly connected to the supported structural body 42, and hanger-rods 44 disposed so as to connect the pedestal to the base. Col. 4, lns. 20-45.

The hanger-rods at a first end are fitted by a first ball bearing 43 into the base. Col. 4, lns. 42-61. At second end, the hanger-rods are fitted by a second ball bearing 43 into a bottom plate 38 which is rigidly fixed to the pedestal. Id.

The disposition of Kalpins' hanger-rods and the workings of the ball bearings allow the pedestal and, correspondingly, the supported structure to undergo pivotal, oscillatory motion relative to the base. That is, the hanger-rods provide pendulum motion to the pedestal and supported structure with respect to the base. The length of the Kalpins pendulum is the length of the hanger-rod or, more specifically, the distance between the axes of rotation of the first and second ball bearings of the hanger-rods. The

period of oscillation of the Kalpins pendulum is defined solely by length of the hanger-rods.

Figure 11 of Kalpins shows the workings of the support system described the reference. The movement of the pedestal and supported structure relative to the base is shown at three stages as 42-A, 42-B, and 42-C. Clearly, pendulum movement exhibited by the Kalpins system is a direct and exclusive function of the length of the hanger-rod. In order to achieve a greater oscillatory range and/or longer period, the length of the hanger-rods must be increased. To achieve large oscillation and period, the hanger-rods must correspondingly be very large.

The system disclosed in Kalpins does not teach or suggest a device exhibiting properties of a Virtual Pendulum. That is, Kalpins does not disclose implicitly, explicitly, or inherently a device allowing pendulum motion of a supported object where the motion is comparable to that of a pendulum having a far greater pendulum length than the actual dimension of the device.

The Examiner will recall that in claim 2 Applicant recites a device for the protection of an object against oscillations of a base including, among other elements, a coupling element having a support point thereon and supporting elements where the supporting elements are dimensioned and positioned such that the support point is capable of freely moving in any lateral direction comparable to the path of movement in the locus of a concave sphere in which the free end of a bi-axially suspended very long pendulum would move, thus, realizing in effect a Virtual Pendulum able to swing in all directions.

These elements of Applicant's invention are clearly not taught or suggested by Kalpins nor by any of the cited references nor by any combination thereof.

By not teach all of the limitations of claim 2, Kalpins does not anticipate claim 2. Thus, the outstanding rejection issued under 35 U.S.C. 102 is not proper and may not be maintained. Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 6, 7, and 29 are also presently rejected under 35 U.S.C. 102 as being anticipated by Kalpins. However, claims 6, 7, and 29 properly depend from what is asserted to be an allowable claim 2. Thus, claims 6, 7, and 29 are allowable as depending from an allowable base claim. Reconsideration, withdrawal of the outstanding rejections, and allowance of claims 6, 7, and 29 are respectfully requested.

Conclusion

The outstanding objections to claims 3-5 and 8-28 have been fully addressed herein by amendment and remarks. Withdrawal of the objections and allowance of claims 3-5 and 8-28 is respectfully requested.

The outstanding rejections to claims 2, 6, 7, and 29 have fully been addressed herein. Particularly, as demonstrated above, the cited references do not teach or suggest all of the claim limitations of Applicant's invention, thus, claims 2, 6, 7, and 29 are now allowable. Withdrawal of the rejections and allowance of claims 2, 6, 7, and 29 is respectfully requested.

The Examiner is invited to contact Applicant's attorneys directly at the below-listed telephone number regarding this Response or otherwise concerning the present application.

Please find enclosed the necessary Petition for Extension of Time (3 months) and a check in the amount of the corresponding fee.

Also please find enclosed a Revocation of Power of Attorney and a newly executed Power of Attorney appointing the undersigned as Applicant's legal representatives and establishing a new correspondence address. Please update U.S.P.T.O. records and files accordingly.

If there are any additional charges with respect to this Response or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorney.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

9. (Amended/Marked Up) Device according to claim[s] 2 [and 8], thus characterized, that, differing from the device according to claim 8, the coupling element (8) is supported by several symetrically positioned parallel supporting elements (2), and the supporting element (14) is supported in the coupling element (8) in a bi-axial bearing. (FIG.22, 23, 24)

10. (Amended/Marked Up) Device according to claim[s] 2 [to 9] thus characterized that, for the purpose of wind load compensation, a shaft (42) is positioned beneath the supported object (1) between the base (6) and the object (1) to restrain lateral forces, whereby one end of the shaft (42) is rigidly connected to one end of a preloaded extension spring (41), which other end is rigidly connected either to the base (6) or the supported object (1), and whereby the other end of the shaft (42) sticks axially movable into a bi-axially movable spherical bearing (43) that is connected either to the supported object (1) or to the base (6), and through which the position of the object (1) is fixed towards the base (6), and a relative movability of the object (1) and the base (6) towards each other becomes only possible if a lateral force impacts the shaft (42) that exceeds the tension force of the preloaded extension spring (41). (FIG.25)

11. (Amended/Marked Up) Device according to claim[s] 2 [to 9], thus characterized that underneath the supported object (1) between the base (6) and the object (1) is positioned a shaft (42) to retain lateral forces, whereby one end of the shaft (42) is rigidly connected to an elastomeric spring block (48), that is rigidly connected either to the base (6) or to the supported object (1), and whereby the other end of the shaft sticks axially movable into a bi-axially movable spherical bearing (43), which is connected either to the supported object (1) or to the base (6), through which the position of object (1) and base (6) towards each other is elastically fixed. (FIG.26)

12. (Amended/Marked Up) Device according to claim[s] 2 [to 9], thus characterized that for the purpose of the compensation of wind loads underneath the supported object (1) one or several wind load compensation devices (50) are installed, whereby for each device a vertically guided sphere (44), that can turn in all directions, is pressed with a predetermined force by a mechanical or hydropneumatic spring (47) downwards into the center of a to the base (6), rigidly connected hollow cone (45), which has a particular opening angle that increases from its center to 180° degrees, through which a shape locked connection between the object (1) and the base (6) comes about, that can transfer horizontal forces up to a limit value, determined by the spring force and the opening angle in the center of the hollow cone (45). When the limit value is exceeded by the horizontal force, the incline of the hollow cone (45) lifts the sphere (44) vertically against the spring force, and the sphere (44) rolls into the area of the lessening incline of the hollow cone (45), through which the horizontally transferable force decreases and becomes zero outside the area of the hollow cone (45), and therefore, during relative

movements of the base (6) towards the object (1) caused by earthquakes, only little or, depending on the amplitude of oscillations, virtually zero horizontal forces are transferred from the base (6) onto the object (1). (FIG.27)

16. (Amended/Marked Up) Device according to claim[s] 2 [to 9], thus characterized that, for the purpose of compensation of wind loads, between the vertical walls of the base (6) and the supported object (1) there are at least 3 pairs of mechanical or hydropneumatic springs (47) with a low spring rate mirror-image wise positioned around the supported object (1), with one pair for each axis of movement, one pair for the vertical axis and two pairs for the two horizontal axes, and wherein at their ends towards the wall of the base they have mounted a sliding or a rolling gear, horizontally movable with one or several rolls on an extendable guidance system. (FIG.28, 29, 30)

18. (Amended/Marked Up) Device according to claim[s] 16 [and 17], thus characterized that the relative movement between the oscillating base (6) and the object, supported by Virtual Pendulums, which decouple the supported object from the oscillating base, is used to power one or several auxiliary energy pumps (37), which can be configured by themselves or in connection with to the relative movement responding centering and wind force compensating elements. (FIG.28, 30)

19. (Amended/Marked Up) Device according to claim[s] 2 [to 9], thus characterized that a from the main building structure (51) separated part of the building (22), which is not exposed to any wind loads and which is also supported by Virtual

Pendulums (56u), serves as a position reference for the position control of the main building exposed to wind loads. (FIG.31)

20. (Amended/Marked Up) Device according to claim[s] 2 [to 9], thus characterized that the load support element between the load support point (P) of the Virtual Pendulum and the supported object (51) is designed as a vertical spring element with a very low spring rate and corresponding damping, whereby the spring elements can be of a mechanical, hydropneumatic or fluid elastic kind. (FIG.32)

21. (Amended/Marked Up) Device according to claim[s] 4[, 6, 10 and 20], thus characterized that devices for wind load compensation (70) and vertical shock absorbtion (69) are integrated with a Virtual Pendulum (56) into one unit. (FIG.33, 56)

23. (Amended/Marked Up) Device according to claim[s] 4 [and 6], thus charcterized that the coupling element (8, 9) has the load bearing support point (P) positioned at its underside and that it supports hanging objects and that the supporting elements (2, 11) are made of ropes. (FIG.37, 41, 42)

24. (Amended/Marked Up) Device according to claim[s] 8 [and 9], thus characterized that the supporting elements (2) are designed as ropes. (FIG.38, 39)

25. (Amended/Marked Up) Device according to claim[s] 4 [and 23], thus characterized that the hanging pendulum, supporting element (2), hangs from the ceiling, which is connected to the base through the building, and that the unstable, standing pendulum, supporting element (7), at its lower end is supported by a center support point, that is formed by four or three slanted rods, ropes or chains (5), hanging from the ceiling. (FIG.42)

26. (Amended/Marked Up) Device according to claim[s] 4[, 5, 7 and 23], thus characterized that at least three Virtual Pendulums support a mass as a oscillation reducer. (FIG.43, 44, 45, 46, 47, 48)

27. (Amended/Marked Up) Device according to claim[s] 4[, 5, 6, 7, 8, 9, and 23], thus characterized that the stable hanging pendulums can be designed as ropes or chains.
(FIG.36b, 37, 38, 39, 40, 41, 42, 45,46, 47, 48)

28. (Amended/Marked Up) Device according to claim[s] 2 [to 9], thus characterized that as its base to construct the Virtual Pendulums and to transfer the load of the supported object onto the ground a foundation (100) has at its underside towards the rims an inclined curvature. (FIG.49, 56)